M-909

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model
E Model
Tourist Model

Model Name Using Similar Mechanism	New Mechanism
Tape Transport Mechanism Type	MZ-909-100

SPECIFICATIONS

Tape	(MICROCASSETTE)™ (normal position type)
Recording system	2-track 1-channel monaural
Tape speed	2.4 cm/s (15/16 ips), 1.2 cm/s (15/32 ips)
Frequency response	250-4,000 Hz (at 2.4 cm position)
Input/output	Earphone/microphone jack (minijack) Input: sensitivity 0.3 mV for 3 kilohms or lower impedance microphone (PLUG IN POWER) Output: for 8-300 ohms earphone
Power output	9 mW (at 10% harmonic distortion)
Battery life (recording)	Sony UM4 (NU): Approx. 1 hour Sony AM4 (N): Approx. 3 hours
Power requirement	1.5 V DC, one R03 (size AAA) battery
Dimensions	Approx. 67.6 × 64.6 × 18.5 mm (w/h/d) (2 3/4 x 2 5/8 x 3/4 inches) incl. projecting parts and controls
Weight	Approx. 100 g (3.6 oz) incl. batteries
Accessories supplied	Remote control microphone (ECM-J90S) (1), Earphone microphone (1), Carrying case (1), Handstrap (1)

Design and specifications subject to change without notice.

MICROFILM

MICROCASSETTE™-CORDER

SONY®

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Flexible Circuit Board Repairing

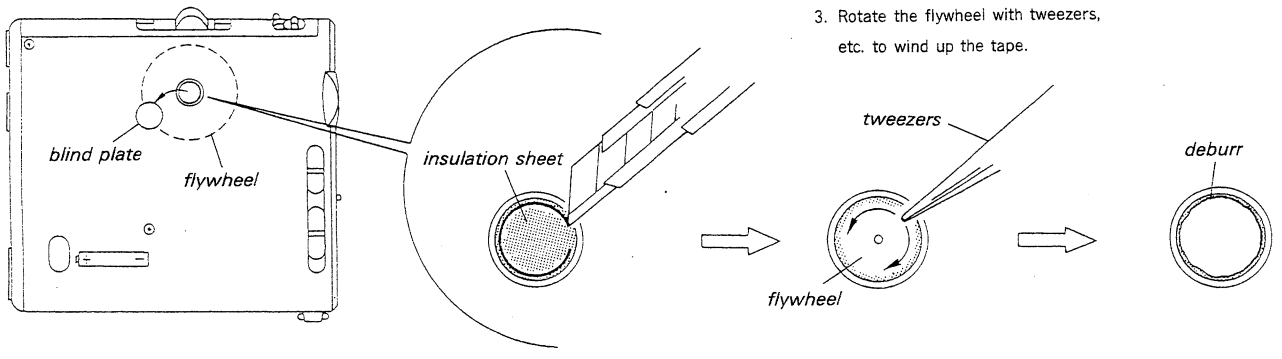
- Keep the temperature of the soldering iron around 270℃ during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (Within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

Note on Servicing

If a tape straggles and the cassette cover does not open, wind up the tape with the following method.



1. Remove a blind plate using tweezers, etc.
2. Cut the insulation sheet into circle along the cabinet to remove the sheet.
3. Rotate the flywheel with tweezers, etc. to wind up the tape.
4. Referring to "Removal" on page 7, remove the front panel assembly and deburr the insulation sheet.

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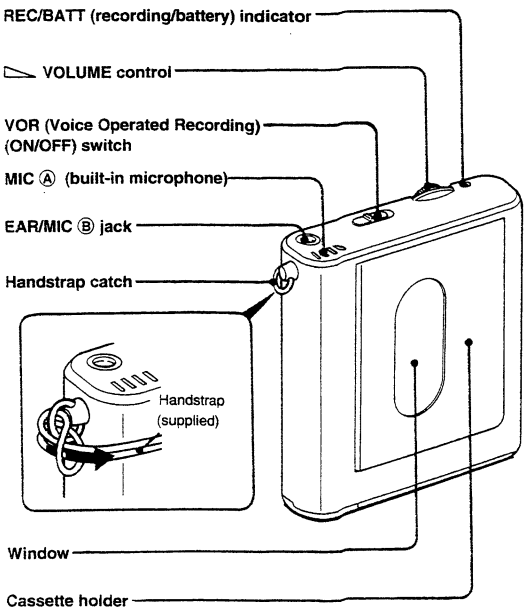
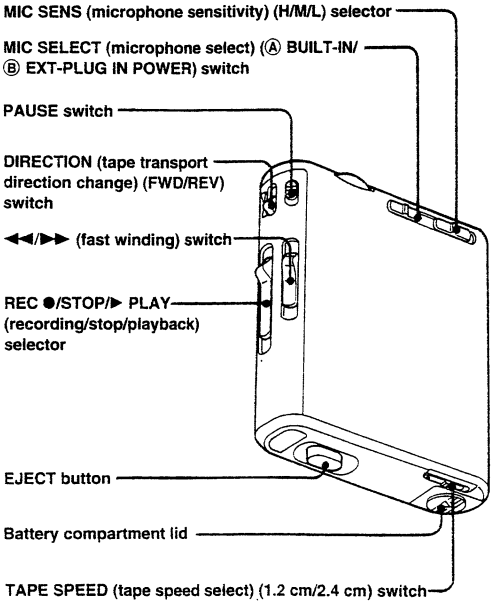
SECTION 1
GENERAL

This section is extracted from instruction manual.

Parts Identification




MIC SENS (microphone sensitivity) (H/M/L) selector
MIC SELECT (microphone select) (Ⓐ BUILT-IN/ Ⓑ EXT-PLUG IN POWER) switch
PAUSE switch
DIRECTION (tape transport direction change) (FWD/REV) switch
◄◄/►► (fast winding) switch
REC ●/STOP/► PLAY (recording/stop/playback) selector
EJECT button
Battery compartment lid
TAPE SPEED (tape speed select) (1.2 cm/2.4 cm) switch

Precautions

Cassette Tape

Use only the MICROCASSETTE™ (Standard Microcassettes) tapes with this unit.

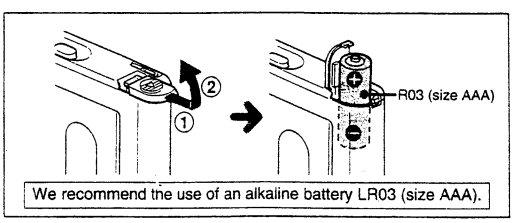
Recording

Before recording, set the VOR, MIC SENS, MIC SELECT and TAPE SPEED switches to the suitable positions.

Location

Do not leave the unit in a location near heat sources, in a place subject to direct sunlight, excessive dust, mechanical shock, or in a car with its windows closed.

Inserting a Battery

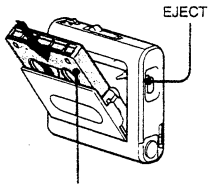
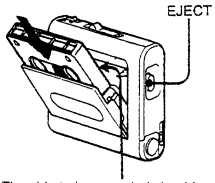
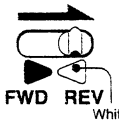


Notes on battery

- Insert the battery with the correct polarity.
- Replace the battery with a new one when the REC/BATT indicator starts to glow faintly and the sound becomes distored or unstable during recording or tape playback.
- Remove the battery when it is not to be used for a long period of time to prevent battery leakage.

Inserting a Cassette

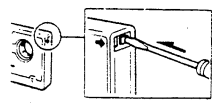
After inserting, set the DIRECTION switch as follows.
Press the EJECT button to open the cassette holder.

	Inserting the cassette	Setting the DIRECTION switch
To record or playback both sides of the cassette	 The side to be recorded or played back should be facing to the cassette holder.	White* The switch will automatically be changed to "REV" when recording or playback finishes on the forward side.
To record one side of the cassette	 The side to be recorded should be facing to the unit.	 White*

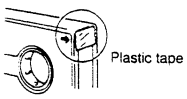
* The white indication shows the tape direction.

Notes
- Before inserting the cassette, take up any slack of the tape with a pencil etc.
- You cannot open the cassette holder during recording or playback.
- When the cassette holder does not close properly, reset the cassette. Do not force to close the holder.
- Do not change the setting of the DIRECTION switch repeatedly during recording or playback. Doing so may cause the tape to slack and it may be caught in the unit.
- During recording, the DIRECTION switch can only be changed from "FWD" to "REV" so as not to erase the previous recording.
- After recording or playback, reset the DIRECTION switch before the next operation. Otherwise, the switch stays at the "REV" position.

To prevent an accidental erasure
Break out and remove the small record-protect tab(s).

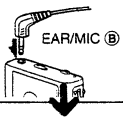
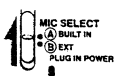
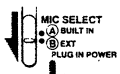
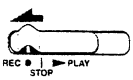


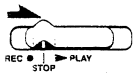
To reuse the cassette after the tab(s) has been removed, cover the slot(s) with plastic tape stretched tightly as illustrated.



Recording

Before recording, make sure that the PAUSE switch is released.

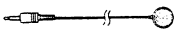
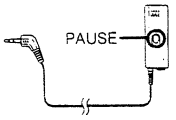
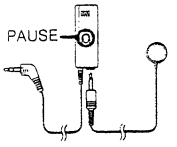
Using with the built-in microphone	Using with the supplied microphone(s)
Insert a cassette and set the DIRECTION switch. (See page 6.)	
	Choose the supplied microphone(s) (See page 10.) and connect the plug to the EAR/MIC jack. 
Set the MIC SELECT switch to "Ⓐ". 	**Set the MIC SELECT switch to "Ⓑ".** 
Slide the REC ●/STOP/► PLAY selector to "REC ●".  The recording starts. At the end of the forward side, the tape direction will change to the reverse side automatically, and at the end of the reverse side, the recording will stop and the REC ●/STOP/► PLAY selector will go back to the "STOP" position automatically.	

To pause the recording	Orange*	Remote control microphone
To stop the recording		

* It indicates that the unit is in the pause mode.

Notes
- When operating with the remote control microphone, you will not be able to operate the PAUSE switch on the main unit.
- You cannot operate the ◄◄/►► switch during recording, and likewise you cannot operate the REC ●/STOP/► PLAY switch while using the ◄◄/►► switch.
- You will not be able to record on either side of a cassette if the record-protect tab of the cassette has been removed even from one side. For one side recording, see page 6.
- You cannot monitor the recording sound.

Choosing the Most Suitable Microphone (supplied) for Recording

Earphone microphone* 	**For recording telephone conversation** This earphone can be used as an earphone as well as a microphone. Attach it to your ear and hold a telephone receiver over it.
Remote control microphone 	**For recording a conference or interview** This microphone can be used either as a remote controller (PAUSE function) or a microphone. You can attach it to a pocket or a lapel using the clip on the back.**
Earphone and remote control microphones 	**For playing back just after recording** You can use the remote control microphone as a remote controller, and the earphone microphone as a microphone during recording and as an earphone during playback.

* This earphone has a built-in microphone on the reverse side.
** In this case, your voice will be recorded mainly.

Notes
- Set the MIC SELECT switch to "Ⓑ" when you use the supplied microphone.
- When operating with the remote control microphone, you will not be able to operate the PAUSE switch on the main unit.
- Recording can be made from built-in microphone with the earphone microphone connected to the EAR/MIC jack. In this case, set the MIC SELECT switch to "Ⓐ"
- When you use an optional microphone or earphone, use a monaural one . If you use a stereo one, it may cause malfunction of the unit.

Recording Only When the Sound is Picked up

Set the VOR* switch to "ON"
The recording will start only when the microphone picks up the sound. It economizes tape and battery.

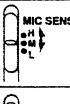
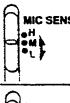
* VOR is an abbreviation of Voice Operated Recording. With this function, the recording will start automatically at a certain sound level and stop when a sound is no longer detected.

Note
Set the VOR switch to "OFF" when you wish to make continuous recording.

Making the Best Conditions for Recording

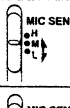
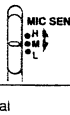
Setting the MIC SENS (H/M/L)* selector

Select the sensitivity of microphone

Earphone microphone		H or M
Remote control microphone		M or L
Built-in microphone		H or M

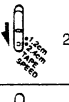
*H: for low sound M: normal L: for loud sound

When the VOR switch is set to "ON"

For noisy places		M or L
For quiet or open places		H or M

*H: recording starts at low sound level. M: normal
L: recording starts at high sound level.

Setting the TAPE SPEED (1.2 cm/2.4 cm) switch

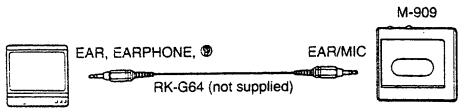
For normal recording		2.4 cm
For extended recording*		1.2 cm

* When you set the TAPE SPEED switch to "1.2 cm", a 120 minute recording can be made using both sides of the 60 minute microcassette.
If you play back that tape with another unit, the sound quality may be different.

Notes
- Use an alkaline battery when you set the switch to "1.2 cm" to ensure sufficient battery life during extended recording.
- Set the switch to "2.4 cm" for the optimum recording sound.

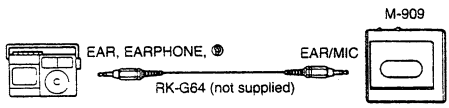
Recording from Various Sound Sources

Recording from a radio or TV equipped with an earphone jack



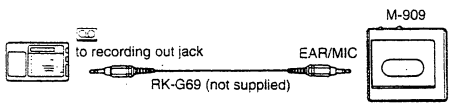
Tune in a desired station and adjust the radio or TV to a normal listening level.

Dubbing from another cassette-corder



Set it in the playback mode and adjust it to your normal listening level.

Recording from a radio or TV equipped with a recording jack



Tune in a desired station.

Notes

- When recording with an external microphone, adjust the MIC SENS selector depending on the recording condition.
- When recording from other sound sources, normally set the MIC SENS selector to "H".

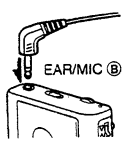
If your radio, TV, etc. is not Sony product, refer to the instruction manual of that unit.

Tape Playback

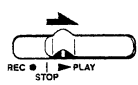
Before starting a playback, make sure that the PAUSE switch is released, and set the TAPE SPEED switch to the same position as that used for recording.

1 **Insert a cassette and set the DIRECTION switch. (See page 6.)**

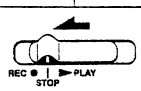
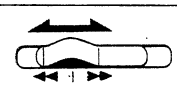
2 **Connect the earphone microphone or the earphone and remote control microphones to the EAR/MIC jack. (See page 10.)**



3 **Slide the REC ●/STOP/▶ PLAY selector to "▶ PLAY".**



The playback starts.
At the end of the forward side, the tape direction will change to the reverse side automatically, and at the end of the reverse side, the playback will stop and the REC ●/STOP/▶ PLAY selector will go back to the "STOP" position automatically.

To pause the playback*		Remote control microphone
To stop the playback		
To rapidly advance or rewind the tape***		

* To cancel the pause mode, slide the PAUSE switch to the opposite direction to the arrow.
** It indicates that the unit is in the pause mode.
*** To stop, set the switch to the off (middle) position.

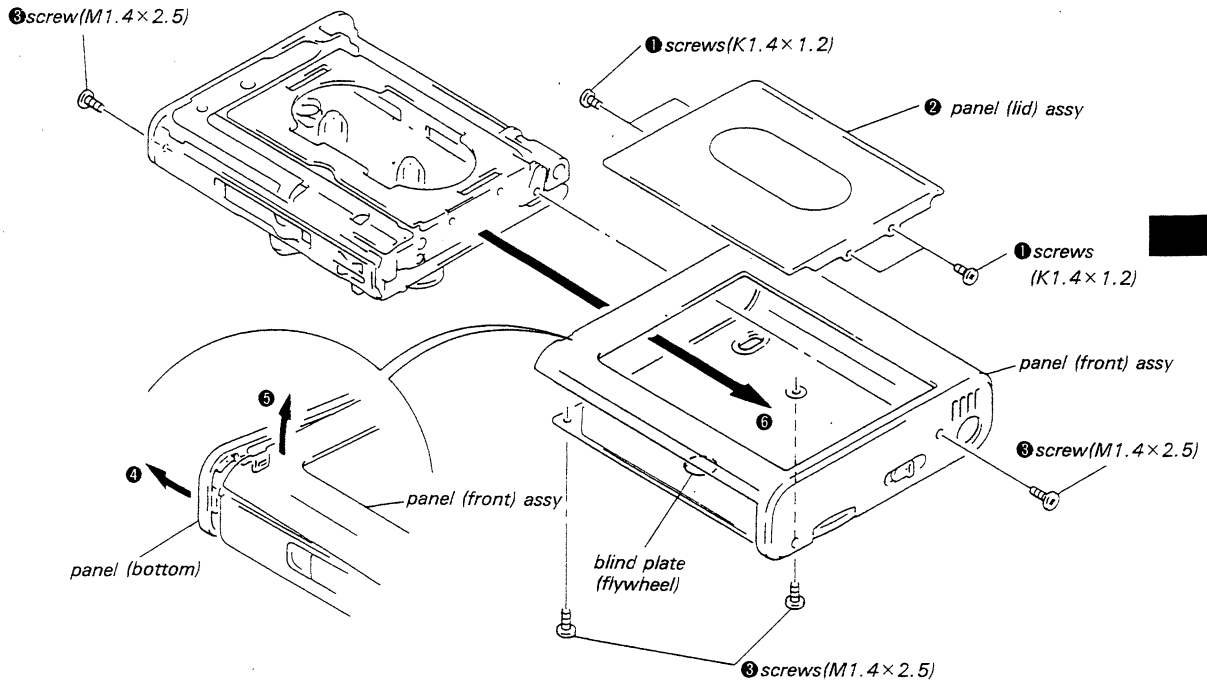
Notes

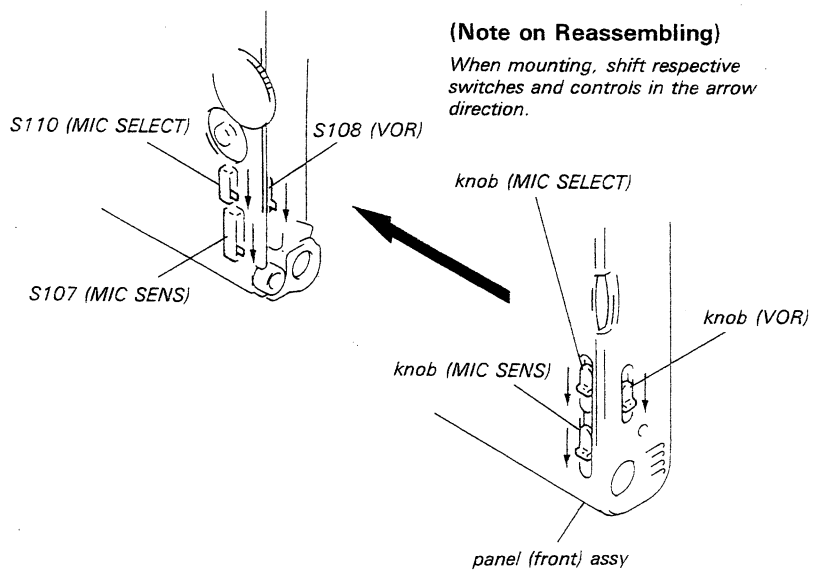
- When operating with the remote control microphone, you will not be able to operate the PAUSE switch on the main unit.
- You cannot operate the ◀◀/▶▶ switch during playback, likewise you cannot operate the REC ●/STOP/▶ PLAY selector while using the ◀◀/▶▶ switch.

SECTION 2
DISASSEMBLY

· Note : Follow the disassembly procedure in the numerical order given.

PANEL (FRONT) ASSY

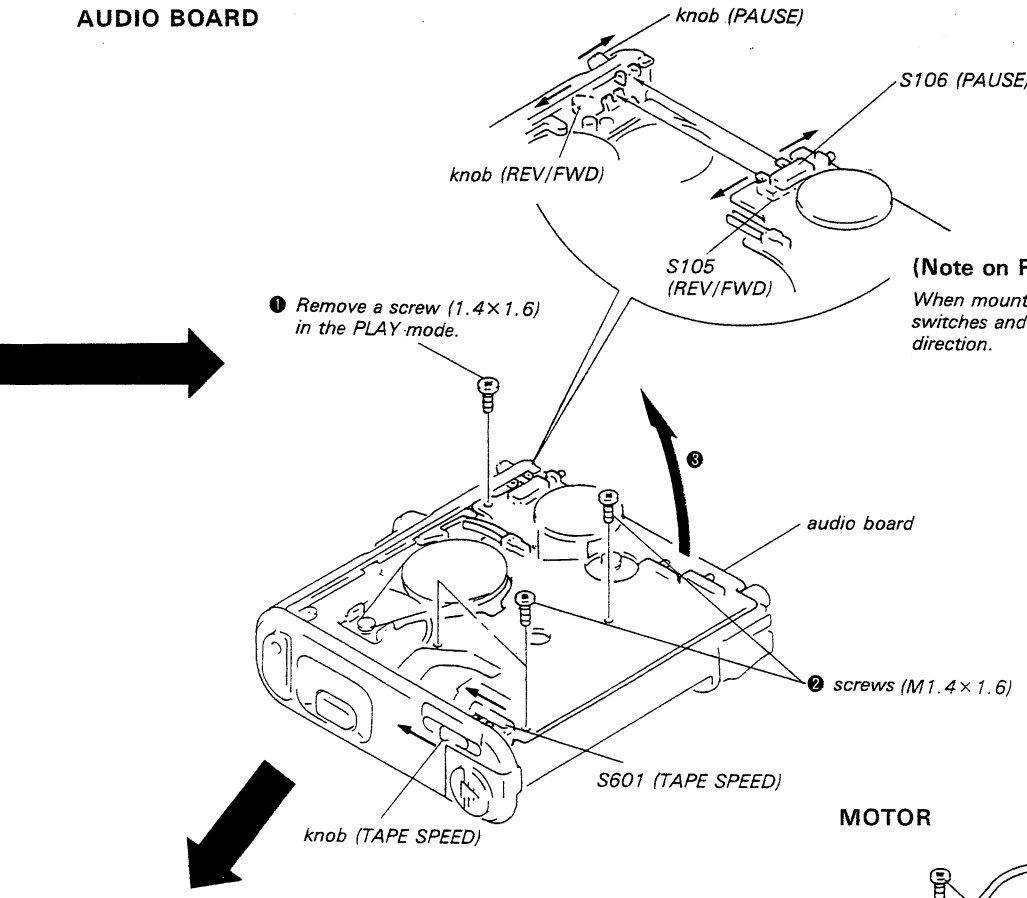




(Note on Reassembling)

When mounting, shift respective switches and controls in the arrow direction.

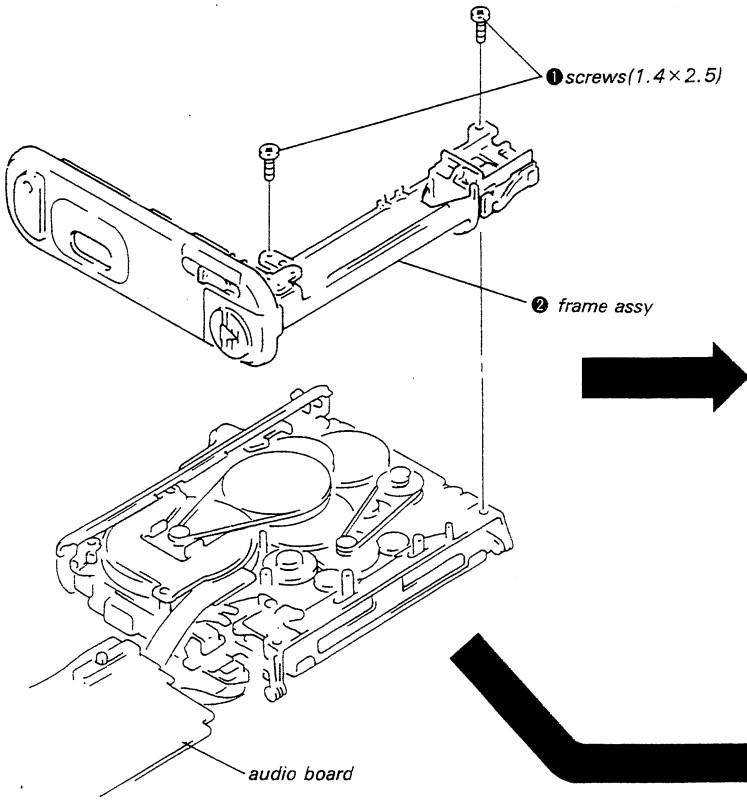
AUDIO BOARD



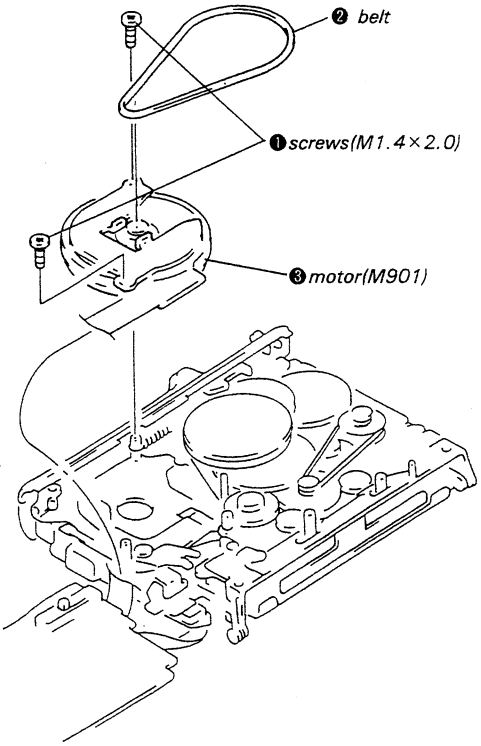
(Note on Reassembling)

When mounting, shift respective switches and controls in the arrow direction.

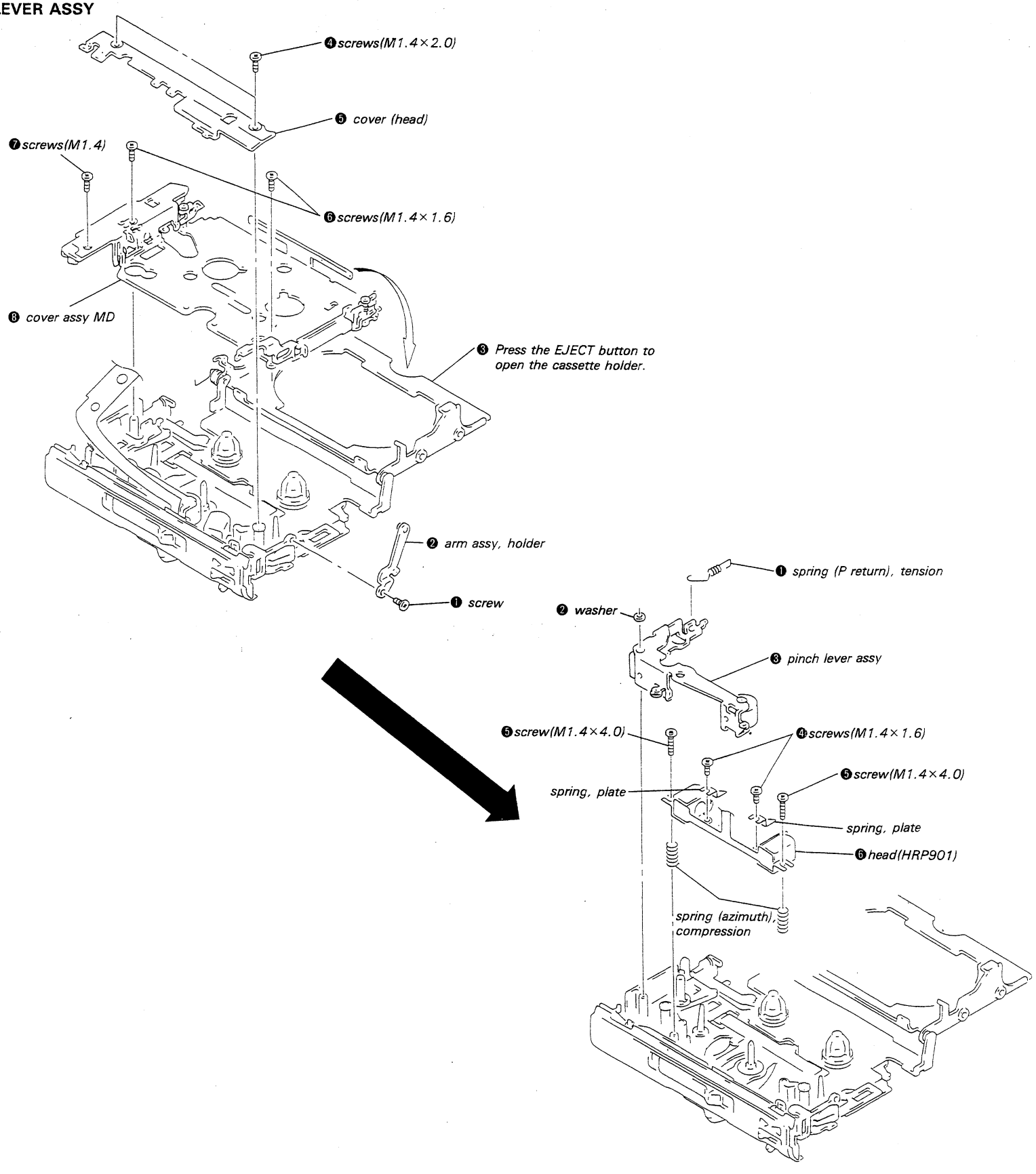
FRAME ASSY



MOTOR



HEAD, PINCH LEVER ASSY



SECTION 3
MECHANICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab :
   record／playback／erase head　pinch roller
   rubber belts　capstan
2. Demagnetize the record／playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed in the rated power supply voltage (1.25V DC) unless otherwise noted.

Torque Measurement

TAPE SPEED switch : 2.4cm/s

Mode	Torque meter	Meter reading
FWD	CQ - 103M	4.5-10g · cm (0.06－0.14oz · inch)
FF, REW	CQ - 201M	10g · cm (0.208oz · inch)

Tape Tension Measurement

TAPE SPEED switch : 2.4cm/s

Mode	Torque meter	Meter reading
FWD	CQ - 403M	15g · cm (0.208oz · inch)

SECTION 4
ELECTRICAL ADJUSTMENTS

Standard Input Level

Input terminal	EAR/MIC Ⓑ
Source impedance	300Ω
Input level	0.77mV(-60dB)
Frequency	1kHz

Standard Output Level

Output terminal	EAR/MIC Ⓑ
Load impedance	16Ω
Output level	0.14V(-15dB)

Test tape

Type	Signal	Used for
S-2-A030	3kHz, -20dB	Azimuth Adjustment
WS-24	3kHz, -10dB	Tape Speed Adjustment

0dB＝0.775V

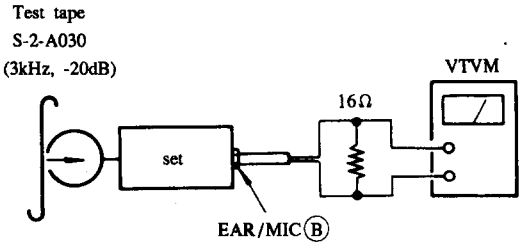
· Switches and controls should be set as follows unless otherwise specified.

VOLUME : Standard output level position
TAPE SPEED switch : 2.4cm/s
MIC SENS : H
VOR switch : OFF

Record／Playback／Erase Head Azimuth Adjustment

Procedure :

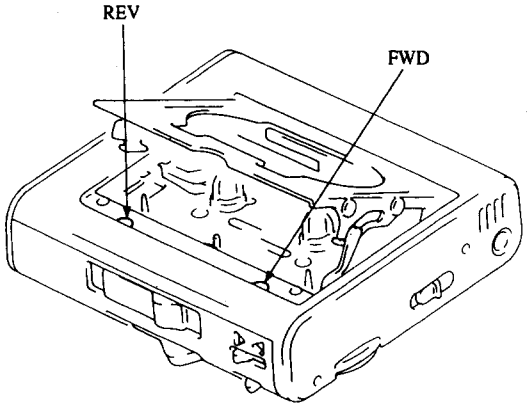
— FWD / REV playback —



· Rotate the screw to adjust VTVM reading to the maximum.

Note : Adjust to the maximum peak though there may be two or three peaks.

Adjustment Location :

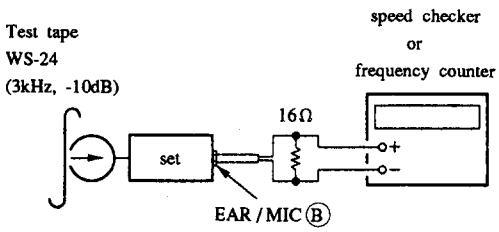


Tape speed Adjustment

Procedure :

After adjusting the 2.4cm/s speed, adjust the 1.2cm/s speed.

— FWD/REV playback —

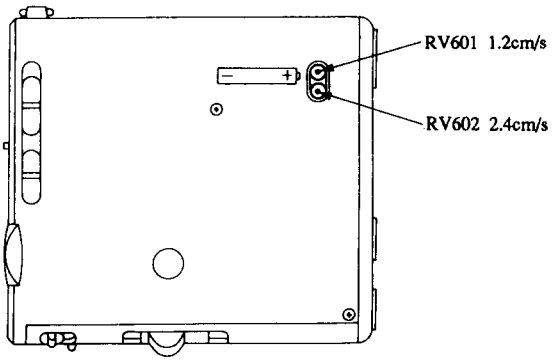


Adjustment value :

Speed	Speed checker	frequency counter
2.4cm/s	±1%	2,970−3,030Hz
1.2cm/s	±1%	1,485−1,515Hz

Adjustment Location :

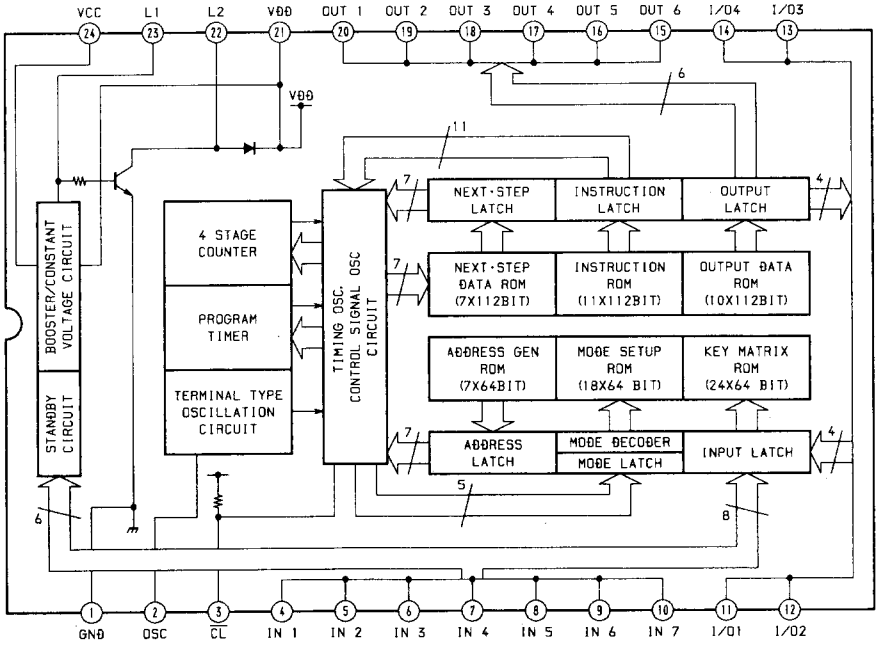
— Back view —



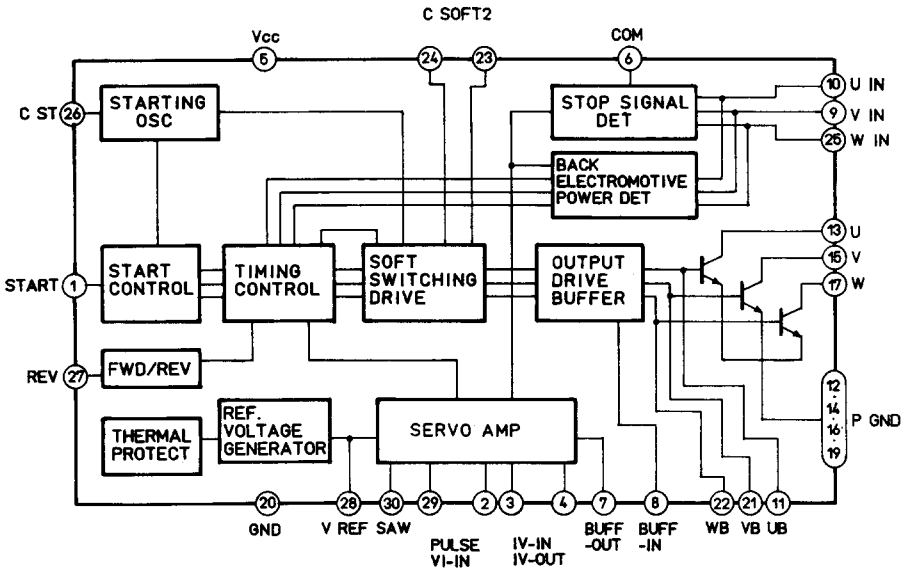
SECTION 5
DIAGRAMS

5-1. IC BLOCK DIAGRAMS

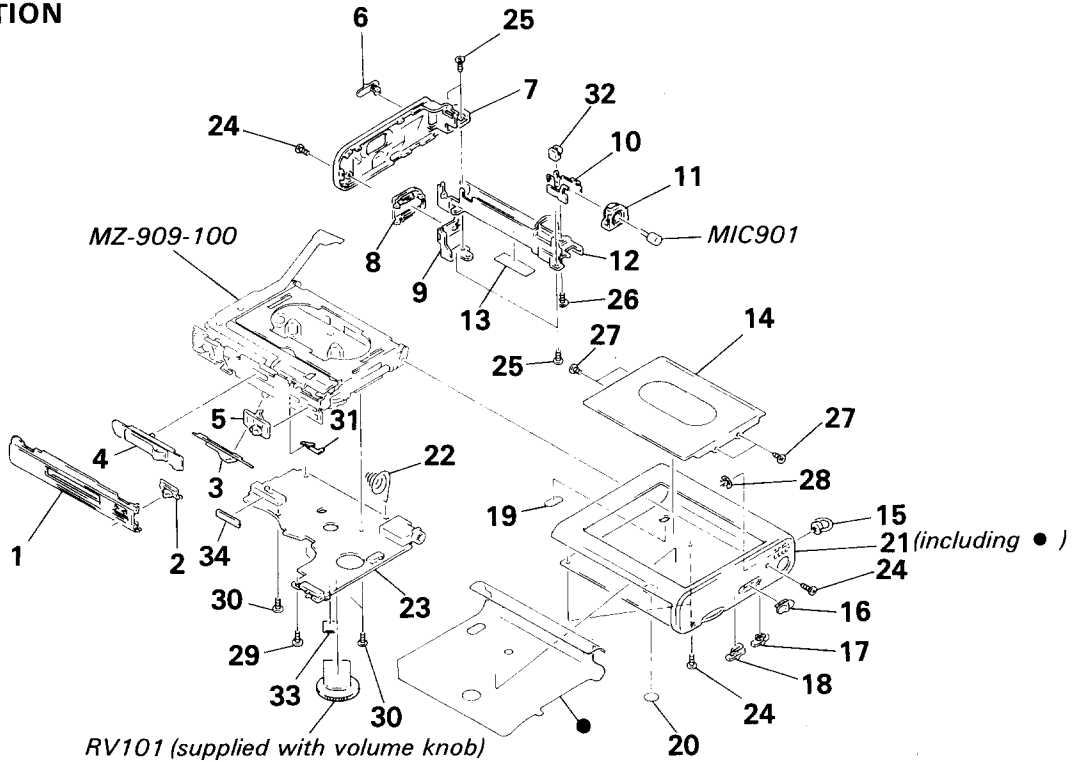
IC401 TB2001FN



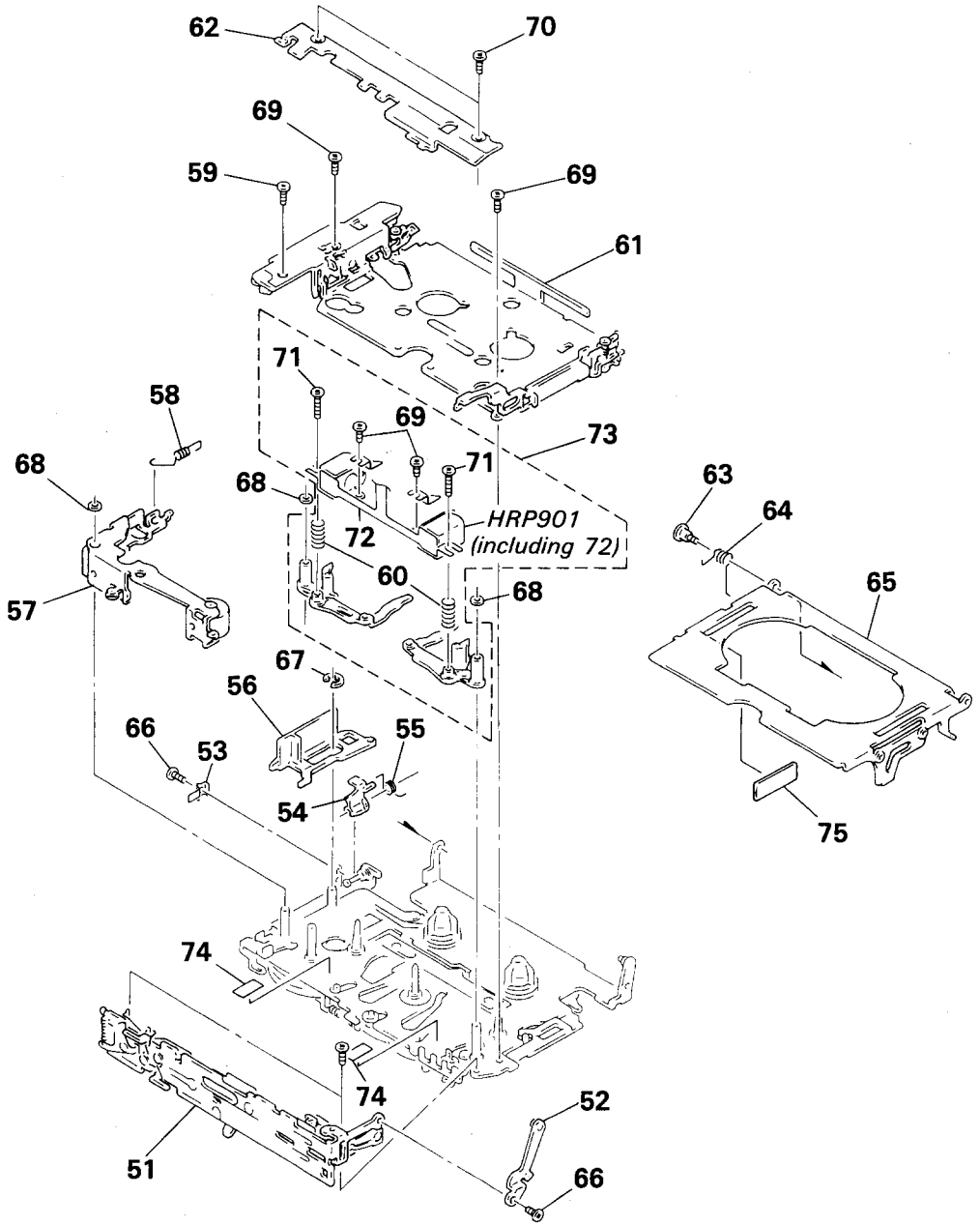
IC601 TLP326



6-1. OVERALL SECTION



6-2. MECHANISM SECTION 1
MZ-909-100



6-3. MECHANISM SECTION 2

MZ-909-100